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USER'S MANUAL AND GUIDE TO THE ACSES QUIZ SYSTEM

by

Richard Ivan Anderson

October 1976

DEPARTMENT OF COMPUTER SCIENCE
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN · URBANA, ILLINOIS

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Richard Ivan Anderson

October 1976

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Urbana, Illinois 61801

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1. INTRODUCTION

The following document describes various aspects of the ACSES quiz system as it is currently implemented on the PLATO CAI system. With the intent of an introductory manual, the content herein is directed primarily to the potential quiz system user. Appendices conclude the manual by presenting selected system specifics to allow a user a more comprehensive view of how the system works. A close investigation of this paper should thus yield sufficient details of the quiz system's operation to enable knowledgeable utilization of that which the system offers.

2. SYSTEM PURPOSE AND FUNCTION

The quiz system was designed and implemented by this author to fulfill two purposes as proposed by R. G. Montanelli, Jr.: 1) to provide a student taking a PLATO computer science lesson with both the means to assess how well he or she learned the material that the lesson is intended to cover and a tool to utilize for aid in learning the topic at hand; 2) to provide members of the Department of Computer Science staff with a means to assess how effective and how thorough a PLATO computer science lesson is at teaching its topic.

3. FULFILLMENT OF SYSTEM PURPOSE

To fulfill this dual purpose, a pool of PLATO quizzes (see Appendix D) has been assembled for administration to students at the conclusions of appropriate computer science lessons. Each quiz

has been designed to pertain to some well-defined topic within the computer science field, and each quiz question has been selected by the quiz author to test pertinent details of the topic's content. Incorporated into each quiz is a data collection facility to record question responses as made by students during their initial attempts at the quiz.

Access to the pool of quizzes is provided via the quiz system monitor to authorized individuals employing PLATO computer science lessons for instructional purposes. Such a user can select a quiz of the desired content area, interactively design the quiz to best suit his or her chosen lesson's needs, view the quiz exactly as a student will, and finally, via only a few keypresses, actually "attach" the quiz to the chosen instructional lesson. The latter task does, though, require a bit more effort as changes must be made to the code of the instructional lesson to enable an interface with the quiz. However, these changes are only minor and are clearly outlined to the user when quiz attachment is arranged.

A look at Diagram 1 should be adequate to explain how the instructional lesson/quiz interface operates. At the time a quiz is to be administered to a student, control is transferred from the instructional lesson to a quiz system program that functions as a link to the quiz (arrow A). This program determines which quiz of those available in the system is to be presented for this particular instructional lesson, and control is transferred to it (arrow B). Interaction between the system program and the lesson that produces the quiz occurs at various points during quiz administration (arrow C). Following a review of the corrected quiz, a student is returned to the system program a final

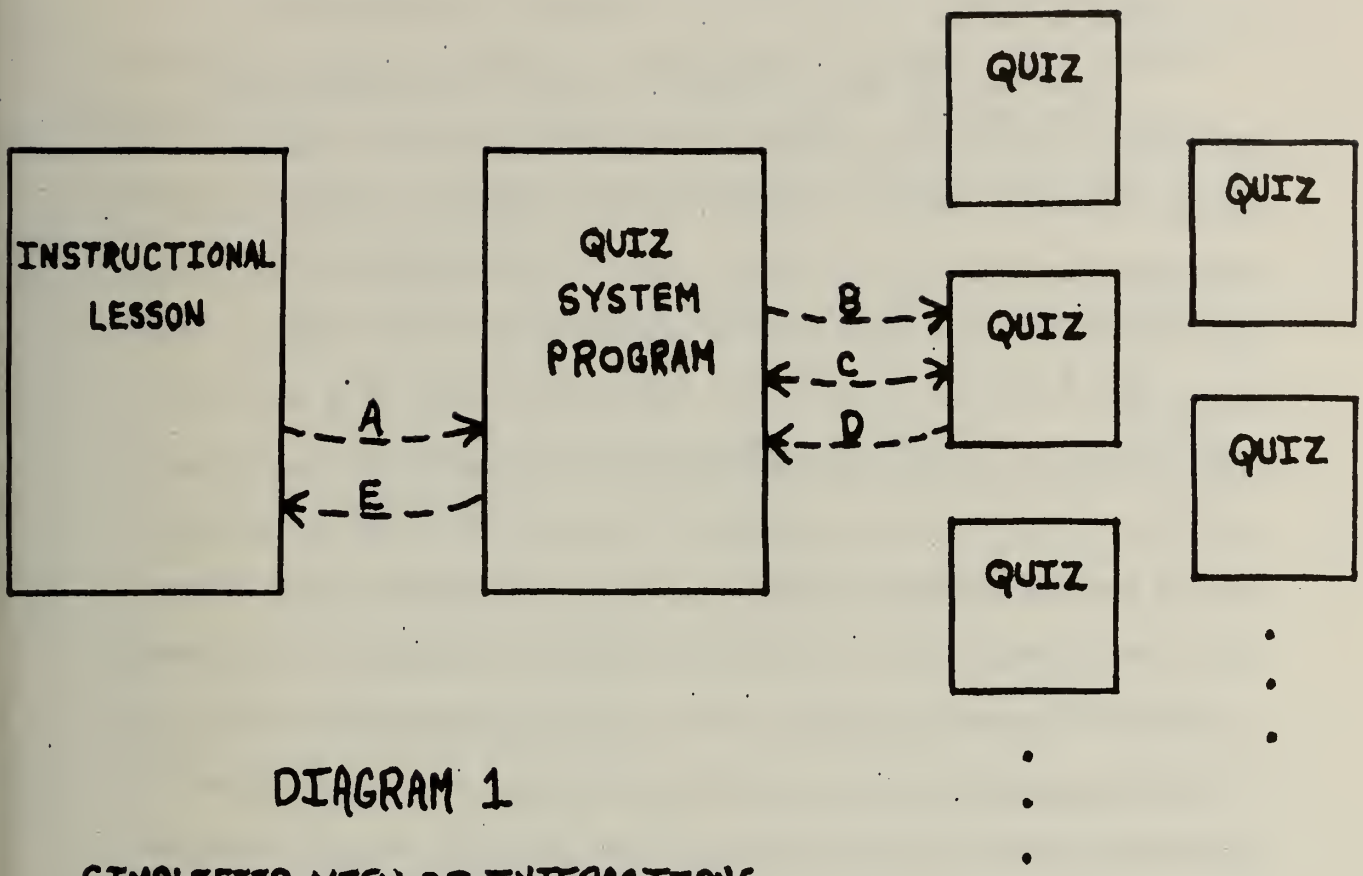

DIAGRAM 1

SIMPLIFIED VIEW OF INTERACTIONS
THAT OCCUR DURING QUIZ ADMINISTRATION

time (arrow D) where return to the appropriate instructional lesson is provided (arrow E).

After the few minor changes are made to the instructional lesson and a quiz has been attached via the system monitor, quiz administration is ready to commence. Each student from then on will have unrestricted access to the quiz and will be informed of the average score obtained on the quiz by other members of his or her course. Each system user from then on will have unrestricted access (via the quiz system monitor) to data that is accumulated for each quiz question and will be informed (for all courses that have used the computer science lesson) of both the average quiz scores and the average amount of time needed for taking the quiz. And each authorized member of the Department of Computer Science staff from then on will have unrestricted access also to the data accumulated for each quiz question to facilitate analysis of the effectiveness and completeness of both the instructional lesson and the quiz.

At the conclusion of course instruction, utilized quizzes should be detached from instructional lessons to clear accumulated course data. This procedure, which can be accomplished through the quiz system monitor, leaves all such data irretrievable. Thus important information should be recorded prior to the fatal keypresses. During the time that a quiz is detached from an instructional lesson, no reversal of the quiz-accomodating-alterations that were made earlier to the lesson are necessary. Transfer of control to the quiz system program so to administer the quiz (arrow A of Diagram 1) will simply result in the display of the message: "No quiz currently exists for this lesson". Control is then immediately returned from whence it was yielded (arrow E of Diagram 1).

4. SCHEME OF QUIZ ADMINISTRATION

All quizzes are designed to be of similar structure (see Appendix A), thus some aspects of the interaction that occurs between a student and a quiz are identical in all cases. The common sequence involved is briefly sketched below (examples are taken from a quiz on FORTRAN character manipulation):

1) once the quiz system program verifies the existence of a quiz for a particular instructional lesson, a page detailing the quiz's purpose is presented to the student (Display 1)

2) quiz questions are then administered; questions may be skipped if the student so desires, and all questions may be reanswered in case an error was made (Display 2)

3) when the student decides that his or her attempt at the quiz is complete, he or she may advance to the presentation of the corrected quiz which is accompanied by clarifying explanations (Display 3)

4) lastly the student is informed of his or her final quiz score as well as the average score received by others in his or her course (Display 4)

5. HOW TO USE THE QUIZ SYSTEM MONITOR

Entrance into the quiz system monitor is achieved via execution of program "csqdata". An individual must receive authorization from the quiz system administrator (see section 7) before use of the system's powers is permitted (Display 5).

Dear anderson,

You are about to take a quiz over the material in lesson fortchar. This quiz, which was not prepared by the author(s) of fortchar, will NOT count as part of your grade. It has instead the following two purposes:

1) to give you, the student, somewhat of an idea of how well you learned the material that the lesson is intended to cover. When you complete the quiz, you'll be shown how well, on the average, previous students have done.

2) to give us, the staff, somewhat of an idea of how effective and thorough the lesson is. Thus the quiz is designed to test what the lesson is supposed to cover. A low score may indicate flaws in the lesson rather than a lack of knowledge on your part.

NOTE: The correct answers to each question will not be revealed until you complete the quiz.

Press: -NEXT- to begin the quiz
-BACK- to postpone the quiz until later

Display 1: PAGE PRESENTED EACH STUDENT PRIOR TO QUIZ

Question 3 of 9 fortchar quiz 2 points

Following execution of the following code--

```
REAL D/'HI'/
CHARACTER G,H*9,B*7/'CHICAGO'/
INTEGER A/'ILLINI'/
G=B
H=B
```

variable G contains exactly:

1) CHICAGO
2) CHIC
*3) CAGO
4) C
5) none of the above

>

* denotes answer you've given

b denotes a blank space

Press: -SHIFT DATA- to have quiz graded
-BACK- for question 2
-NEXT- for question 4

Display 2: SAMPLE QUIZ QUESTION

1 Question 3 of 9 fortchar quiz 2 points

Following execution of the following code--

Since the length of character variable G is not explicitly stated, it defaults to one byte. So when 7-character-long B is assigned to G, the right-most 6 characters are truncated.

```
CHARACTER G,    B*7/'CHICAGO'/
G=B
```

variable G contains exactly:

1) CHICAGO
2) CHIC
*3) CAGO
X 4) C
5) none of the above

* denotes answer you've given
X indicates correct answer
b denotes a blank space

Press: -SHIFT DATA- to exit
-BACK- for question 2
-NEXT- for question 4

Display 3: SAMPLE CORRECTED QUIZ QUESTION

Total score received on quiz: 16/18

Average score of the 3 people of course
cs101ws who have taken the quiz: 9.333/18

To review the quiz again, press -BACK-.
To exit, press -NEXT-.

Display 4: SAMPLE PAGE PRESENTED EACH STUDENT
AFTER REVIEW OF CORRECTED QUIZ

You have just entered the

Quiz System

Authored by Rich Anderson

SORRY

You are not allowed access to this lesson. To be considered for such, state who you are and why you desire access via p-notes to anderson of csa

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Display 5: TITLE PAGE OF QUIZ SYSTEM MONITOR
AS IT APPEARS TO UNAUTHORIZED USERS

All the work of an authorized system user is accomplished via manipulation of five options (Display 6). A brief description of each option follows below:

Option "1) Attach a quiz to a lesson"

To be chosen when a quiz is to be "attached" to an instructional computer science lesson. User receives access to the pool of available quizzes from which one may be selected, designed, and "attached". If desired, a password can be specified to protect the quiz from detachment by other system users. A complete list of changes that must be made to the lesson to enable proper functioning of the lesson/quiz interface is supplied.

Option "2) Detach a quiz from a lesson"

To be chosen when a quiz is to be "detached" from an instructional computer science lesson. User must supply appropriate password (if one was specified earlier via option 1) in order to deal the lesson/quiz interface a fatal blow.

Option "3) View list of lessons with quizzes"

To be chosen to inspect a listing of all computer science lessons currently utilizing a system quiz. Lessons with a quiz attached that for some reason has been disabled are identified.

Option "4) View a quiz's accumulated data"

To be chosen to inspect student data accumulated by both the quiz and the quiz system. Available data includes responses

Choose what you want to do:

1) Attach a quiz to a lesson
2) Detach a quiz from a lesson
3) View list of lessons with quizzes
4) View a quiz's accumulated data
5) Exit

>

TIME -- 13.18.14. DATE -- 08/12/76

Display 6: OPTION PAGE OF AUTHORIZED SYSTEM MONITOR USERS

made by students to each quiz question (Display 7), number of students of each course that have taken the quiz, average quiz score of the students of each course, and the average amount of time required by students of a course to complete the quiz (Display 8).

Option "5) Exit"

To be chosen to end a visit to the quiz system monitor.

6. CURRENT STATUS OF THE QUIZ SYSTEM MONITOR

Currently only quizzes pertaining to selected topics of the FORTRAN programming language have been implemented (see Appendix D). As the first quizzes of the system, these were all designed and developed from objectives used to develop existing FORTRAN instructional lessons; thus very little versatility was provided for a system user to manipulate the quiz design to satisfy other lessons' needs. More quizzes are being developed, however, and those quizzes existing are continually being improved. The availability of a quiz that suits a user's lesson's needs should therefore be investigated via entrance into the quiz system monitor.

7. QUIZ SYSTEM ADMINISTRATOR

The one individual who has complete information about everything involving the quiz system is the quiz system administrator. This person (currently this author) is responsible for the total upkeep of the system and should be held accountable for all quiz system activities.

1 Question 3 of 9 fortchar quiz 2 points

Today is 08.12/76 .

Following execution of the following code--

```
REAL D/'HI'/
CHARACTER G,H*9,B*7/'CHICAGO'/
INTEGER A/'ILLINI'/
G=B
H=B
```

variable G contains exactly:

3	1)	CHICAGO
1	2)	CHIC
1	3)	CAGO
22 X	4)	C
4	5)	none of the above

The number at the left of each possible response indicates the frequency that students chose it.

X indicates correct answer
b denotes a blank space

Press: -SHIFT DATA- to exit
-BACK- for question 2
-NEXT- for question 4

Display 7: SAMPLE DATA ACCUMULATED FOR A QUIZ QUESTION

fortsubex quiz data - 06/15/76 through 08/12/76

COURSE	no. who've taken quiz	Ave score	Ave. time taking quiz*
cs101ws	13	11.69/16	6.62
cs101jl	15	11.47/16	7.20
ge293	1	6.00/16	4.00
cs400	36	9.39/16	8.36
wd106g	6	7.33/16	5.83

*approximate average in minutes

Press -NEXT- to choose another option.

Display 8: SAMPLE ACCUMULATED COURSE DATA FOR A QUIZ

Specific tasks that this person must perform are reflected in the list of options available for a quiz administrator's work (Display 9). Options 1, 2, 4, and 5 are identical in function to the same-numbered options that are available to a quiz system user; the other five options involve tasks exclusive to the quiz system administrator to ensure smoothness of system operation. (see Appendix B)

Any problems that develop or any questions that arise concerning the quiz system should always be brought to the attention of the quiz system administrator. The identity of this indidivual as well as information detailing how he or she may be reached will always be specificed on the title page of the quiz system monitor.

8. EVALUATION OF INSTRUCTIONAL LESSONS

The potential behind the analysis of accumulated quiz question data for purposes of locating instructional lesson weaknesses is well-reflected in a partial examination of the effects of the initial trial of the quiz system which occurred during the fall semester of 1975. One quiz which was prepared to test selected knowledge of character manipulation in the FORTRAN programming language was presented following an instructional lesson of the same topic. The instructional lesson had been used in two courses by approximately 800 students prior to this trial and had undergone various revisions based on information obtained during the courses. The accumulation of question responses for this trial was restricted only to those responses made by students of a particular introductory computer science course.

Display 10 exemplifies the data as accumulated. Since all questions were designed to be answered correctly by all students if all were intelligently attentive while taking a thorough and effective

Choose what you want to do:

1) Attach a quiz to a lesson
2) Detach a quiz from a lesson
3) View list of lessons with quizzes & attachers
4) View a quiz's accumulated data
5) Exit
6) View special system data
7) View list of quiz lessons available
8) Add a new quiz lesson (qg/g)
9) Delete a quiz lesson (qg/g)

>

TIME -- 13.21.34. DATE -- 08/12/76

Display 9: OPTION PAGE OF QUIZ SYSTEM ADMINISTRATOR

Question 3 of 4 [illegible] quiz [illegible]

Today is 12/19/75 .

Following execution of the following code:

```
REAL D/'HI'/
CHARACTER G,H*9,B*7/'CHICAGO'/
INTEGER A/'ILLINI'/
G=B
H=B
```

variable G contains exactly:

1%	1) CHICAGO
3	2) CHIC
0	3) CAGO
3	4) C
3	5) none of the above

The number at the left of each possible response indicates the frequency that students chose it.

% indicates correct answer
b denotes a blank space

Press: -SHIFT DATA- to exit
-BACK- for question 2
-NEXT- for question 4

Display 10: RESPONSE DATA ACCUMULATED DURING INITIAL TRIAL OF SYSTEM

FORTRAN character manipulation lesson, some problem seemed evident due to a split of responses among three of the five alternatives. Although eight students responded correctly, more appeared to conclude that the length of variable G would be the length of the variable assigned to it, and many could find no satisfactory choice among the first four possibilities.

Examination of the instructional lesson revealed two irregularities: 1) nowhere did the lesson mention that the default length of a variable declared to be CHARACTER in type is one; 2) a response to a question requiring students to type a declaration statement for a variable that could accomodate only one character at a time was not judged as acceptable unless the variable length was explicitly specified in the declaration. Both irregularities clearly represented lesson deficiencies; in fact, the latter clearly represented a lesson error.

The instructional lesson immediately underwent a major "face-lift"; the above-mentioned deficiencies and others that were discovered through similar analyses of other quiz question data* dictated a complete lesson restructuring. Display 11 and display 7 exemplify data as accumulated during spring semester 1976 and summer session 1976, respectively, following the instructional lesson's surgery. The effects of the changes are clearly noticeable.

---

*Other deficiencies discovered included no use of special characters and no discussion of the use of character strings in variables declared other than CHARACTER.

9. FINAL NOTE

Various enhancements to and improvements of the quiz system are planned for the future. Such alterations that are foreseen for the "near" future should be of a scope major enough to invalidate any information presented in this document. All occurrences of major system changes will be accompanied by explanatory manual amendments.

Question 3 of 9 fortchar quiz 2 points

Today is 5/28/76.

Following execution of the following code--

```
REAL D/'HI'/
CHARACTER G,H*9,B*7/'CHICAGO'/
INTEGER A/'ILLINI'/
G=B
H=B
```

variable G contains exactly:

17	1)	CHICAGO
3	2)	CHIC
3	3)	CAGO
49 X	4)	C
18	5)	none of the above

The number at the left of each possible response indicates the frequency that students chose it.

X indicates correct answer
b denotes a blank space

Press: -SHIFT DATA- to exit
-BACK- for question 2
-NEXT- for question 4

Display 11: RESPONSE DATA ACCUMULATED FOLLOWING INSTRUCTIONAL LESSON ALTERATIONS

APPENDIX A

The following is a handout as prepared by this author for use by individuals in implementing a quiz-producing lesson. Its content clearly does not encompass information necessary for the development of a "good" criterion-referenced quiz; it is rather intended to encompass the needed basics behind the structure of such a quiz. Since the handout was intended to be a self-contained document, some information presented in it duplicates information as presented in the body of this manual.

GUIDELINES FOR DEVELOPING COMPUTER SCIENCE QUIZZES

(Direct questions or comments to Rich Anderson via phone or send a p-note to anderson of csa.)

1. GENERAL COMMENTS

These guidelines exist since all quizzes written for use with computer science instructional lessons are tied into one organizational system that monitors and controls quiz use. Each quiz must be constructed to conform to certain requirements which will allow such an interface.

Two major purposes of each quiz:

(1) to provide a student with both a means to assess how well he or she learned the material the instructional lesson is intended to cover and a tool to utilize for help at learning the topic at hand.

(2) to provide members of the Department of Computer Science staff with a means to assess how effective and how thorough the instructional lesson is at teaching the topic

Each quiz should be designed to test pertinent aspects of some well-defined topic in the field of computer science. A quiz author should avoid viewing an instructional lesson on the topic since doing so may bias the choice of quiz questions. Contact R. I. Anderson for direction in determining question content.

Quiz questions should neither be "tricky" nor heavily dependent upon knowledge of other materials for complete student understanding. A well-formulated quiz question should be responded to correctly by all students if each was intelligently attentive during a complete and effective instructional lesson.

2. ORGANIZATION OF A QUIZ

Each quiz-producing lesson must perform the four main tasks which are discussed below. Each task must begin at a distinct location in the lesson's code and end via a -jumpout- to the quiz system.

Task 1 - Administration of the quiz to a student

Each question must be presented to a student to allow entry of a response. If a student has previously attempted a question and decides to try it again, his or her original answer (if one had been entered) should be displayed with the question, and a new response should be accepted if the student desires to enter one.

A student is not to be told during this task whether or not his or her response was correct.

When a student decides to quit, the quiz score must be tallied and if this is the first time this student has taken this quiz, student responses must be stored. Exit is then made via a -jumpout- to the system. Following this exit, a student can decide to return and perhaps

change more answers; provisions must thus be made so the final score and stored student responses reflect any possible changes.

Task 2 - Review of the corrected quiz

Each question must in some manner be again presented to a student designating both the correct response and the response the student entered (if indeed the student did respond). The student's scores and response explanations should also be presented if deemed useful to a student.

New answers are not to be accepted during this task.

When a student decides to quit, exit should be made via a -jumpout- to the system. Following this exit, a student can decide to return to again review the corrected quiz.

Task 3 - Presentation of student responses

All final student responses should have been retained exactly (if possible) in a "permanent" location such as (and probably) lesson common. Thus, each question's responses should in some manner be displayed allowing analysis by the staff to locate weaknesses in the instructional lesson, the quiz, and the students.

Task 4 - Accepting quiz specifications from system user

Comments about the quiz questions' content should be presented along with any options available to a user to allow him or her some say in what comprises the quiz. A keypress should be all that is necessary to: take a system user into the quiz as a student would view it; take a system user into reviewing the corrected quiz as a student would review it; take a system user back to the system via a -jumpout-.

Much of the content of the pages that follow is derived from a handout prepared by L. R. Whitlock[1] (1976). The basics of the interface utilized in the exam system to enable a problem generator/grader to be a part of an exam have been incorporated into the interface utilized in the quiz system to enable a quiz to administered following an instructional lesson. This thus allows a quiz-producing lesson to be used as a part of an exam or a problem generator/grader to be used as a quiz.

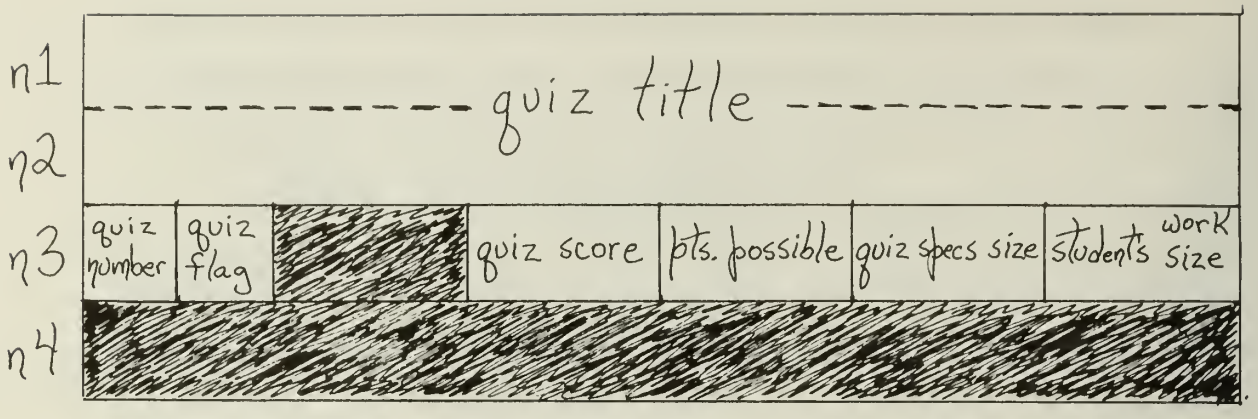
3. USE OF STUDENT VARIABLES

All student variables are available for use by a quiz-producing lesson except n131 through n150; never use student variables n131 through n150.

A "quiz header" will occupy the first four student variables. Portions of it that are of importance to the quiz-producing lesson are described on the next page.

---

[1] "Problem Generator/Grader for the Generative Exam System" contents of which can now be mostly found in "Documentation on the Generative Exam System", 6/22/76.



NOTE: Never use the shaded portions!

Quiz title[2]: 20 character (or less) title of the quiz

Quiz number[2]: supplied for display on quiz pages

Quiz flag[2]: =0 when a student is first attempting the quiz;
≠0 after student exits quiz, then returns to make changes to some answers

Quiz score: score student earned on quiz (assigned by the quiz-producing lesson when student ends Task 1)

Pts. possible: maximum number of points possible on the quiz (assigned by quiz-producing lesson during Task 4)

Quiz specs size: number of student variables needed by the quiz-producing lesson to specify precisely what quiz questions to administer plus 4 (assigned by quiz-producing lesson during Task 4)

Student's work size: number of student variables needed to hold a student's precise answers plus 4 (assigned by the quiz-producing lesson during Task 4)

---

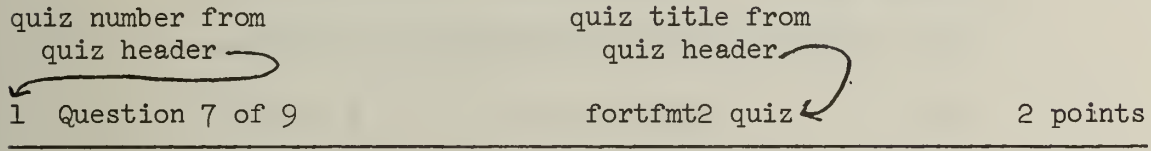
[2] read only - never change its contents

Define the first four student variables as follows:

```
define      qh_ttl=n1                  $$quiz title (2 words)
            segment,qhl=n3,5
            qh_num=qhl(1)              $$quiz number
            qh_flg=qhl(2)              $$quiz flag
            segment,qh2=n3,10
            qh_sco=qh2(3)              $$score on quiz
            qh_max=qh2(4)              $$total possible points
            qh_spc=qh2(5)              $$quiz specs size
            qh_sws=qh2(6)              $$student's work size
```

4. FORMAT OF QUIZ PAGES

The top of each quiz page should appear similar to the following example:



At the bottom of each page should be information stating what a student can do next. For example:

```
Press:  -NEXT- for the next question
        -BACK- for the previous question
        -SHIFT DATA- to quit
        -HELP- for some aid
```

5. KEY CONVENTIONS

To maintain uniformity among all quizzes, the following key conventions should be adhered to as closely as possible:

For tasks 1 & 2:

-SHIFT DATA-[3]	:	-jumpout- student to quiz system
-SHIFT HELP-	:	present explanation about whole quiz
-HELP-	:	present explanation of current question
-NEXT-[3]	:	advance student to next quiz page
-BACK-[3]	:	take student to previous quiz page

For task 3:

An appropriate subset of the keys of tasks 1 & 2.

For task 4:

-SHIFT DATA-	:	-jumpout- user to the quiz system
-SHIFT LAB-	:	review corrected quiz as a student
-LAB-	:	administer quiz as to a student

6. RECIPES FOR THE FOUR TASKS

The processing necessary in each of the four tasks that a quiz-producing lesson must perform is presented below in a step-wise manner. Minor variations may be necessitated depending upon the particular quiz.

---

[3]These keys should all accept a student response for task 1.

Task 1 Processing

(1) quiz flag should be checked to determine whether or not a student is returning to reanswer questions; if so, previous student responses follow the quiz header; otherwise quiz specifications follow the quiz header and should be placed in other student variables

(2) present question showing previous response

(3) receive new response

(4) save precise response so showing previous response (2) is possible

(5) judge the response (but don't tell student)

(6) if the value of the system-defined variable -lscore- equals -1, update permanent statistics to reflect the student's answer (be sure only to record the student's last answer to the question)

(7) go to 2

The loop above continues until student decides to quit. Then:

(8) quiz score should be tallied and stored in quiz header

(9) place student responses in student variables which immediately follow the quiz header (i.e. beginning with n5)

(10) execute these commands: -inhibit dropstor-
-jumpout return,return-

Task 2 Processing

(1) [in case used in exam system] quiz flag will be 0 if student did not enter task 1; otherwise ≠0. If 0, quiz specs follow quiz header; otherwise student responses follow quiz header

(2) present question, student's response, and correct response

(3) offer explanations

(4) go to 2

The loop above continues until a student decides to quit. Then:

(5) execute these commands: -inhibit dropstor-
-jumpout return,return-

Task 3 Processing

(1) present accumulated student responses to each question

(2) when user finishes viewing data, execute the following command: -jumpout return,return-

Task 4 Processing

(1) provide information about the quiz questions

(2) allow instructor to view and review quiz as would a student

(3) allow user to make available quiz specifications

(4) place specifications in student variables immediately following the quiz header (i.e. beginning with n5)

(5) assign values to maximum points possible, quiz specs size, and student's work size (all in quiz header)

(6) when user finishes, execute: -jumpout return,return-

Below is a list of the nine options available to the quiz system administrator through the quiz system monitor. Each option is accompanied by a brief discussion of what each involves.

Option "1) Attach a quiz to a lesson"

To be chosen when a quiz is to be "attached" to an instructional computer science lesson. User receives access to the pool of available quizzes from which one may be selected, designed, and "attached". If desired, a password can be specified to protect the quiz from detachment by other system users. A complete list of changes that must be made to the lesson to enable proper functioning of the lesson/quiz interface is supplied.

Option "2) Detach a quiz from a lesson"

To be chosen when a quiz is to be "detached" from an instructional computer science lesson. User must supply appropriate password (if one was specified earlier via option 1) in order to deal the lesson/quiz interface a fatal blow.

Option "3) View list of lessons with quizzes & attachers"

To be chosen to inspect a listing of all computer science lessons currently utilizing a system quiz. Lessons with a quiz attached that for some reason has been disabled are identified. The identities of the individuals who attached the quizzes are displayed as well as the date that the attachment occurred (Display 12).

Lesson_Name	<-- ATTACHED BY --->	of <-COURSE->	on <-DATE-
fortdo	anderson	csa	07/05/76
fortarray2	mont	csa	06/15/76
fortsubex	anderson	csa	06/15/76
fortchar	anderson	csa	07/07/76
* fortfunct	danielson	csa	08/12/76

* indicates quiz is disabled and requires deletion

------ end of list ------

Display 12: SAMPLE LIST OF INSTRUCTIONAL LESSONS WITH QUIZZES

Option "5) Exit"

To be chosen to end a visit to the quiz system monitor.

Option "6) View special system data"

To be chosen to inspect details of the status of the quiz system to ensure its smooth operation. If detectable problems had at some time developed, appropriate warning messages are displayed.

Option "7) View list of quiz lessons available"

To be chosen to inspect a listing of all the lessons currently a part of the system that are available to system users to produce quizzes. Each lesson name is accompanied by information specific to the lesson that enables proper coordination between the quiz-producing lesson and the quiz system monitor.

Option "8) Add a new quiz lesson (qg/g)"[4]

To be chosen to add a quiz-producing lesson to the pool of quizzes available in the system. All information necessary to incorporate the new lesson into the system must be entered (Display 13).

Option "9) Delete a quiz lesson (qg/g)"[4]

To be chosen to remove a quiz-producing lesson from the pool of quizzes available in the system. An alert is issued if deletion of a specific quiz-producing lesson would disable an existing instructional lesson/quiz interface (Display 14).

---

[4] qg/g is an abbreviation for "quiz generator/grader", a phrase which technically describes the lesson's function.

Supply the following information about the quiz lesson (qg/g):

(1) Lesson name fortfmt1q

(2) Twenty character description fortran formatting

Four entry points:

(3) to attach quiz attch
(4) to give quiz >
(5) to review quiz revw
(6) to analyze quiz responses data

Type the number of an item to change it
OR
press -SHIFT NEXT- to add to the system.

Display 13: SAMPLE DISPLAY DURING ADDITION OF A QUIZ-PRODUCING LESSON TO THE SYSTEM

```
Name the quiz lesson (qg g) you wish deleted from the system:
                        » fortfunctq

        Are you sure you want to delete this quiz
        lesson (qg/g)?  It appears you'll disable 1
        quiz(zes) if you do!


        Press -SHIFT HELP- to delete
                 (The quiz(zes) disabled will be flagged
                  on the list of lessons with quizzes,
                  option 3)
        Press -BACK- to exit without deleting
```

Display 14: SAMPLE DISPLAY DURING DELETION OF A QUIZ-PRODUCING LESSON FROM THE SYSTEM

APPENDIX C

Certain facts about the quiz system's organization and limitations remain to be mentioned to permit a more complete view of the system and its operation. Since many of these tidbits are quite unrelated, all are presented as elements of a list:

- The maximum number of instructional lessons that can be issued a quiz by the system is fifty. However, due to variations that are possible in the amount of storage space required to handle different instructional lesson/quiz interfaces, the actual number of lessons that can be accomodated may actually be less than fifty.

- The maximum number of quiz-producing lessons that can be made available to system users is fifty.

- Data to indicate average quiz scores, numbers of students who have taken a quiz, and average lengths of time required for students to take a quiz is accumulated separately for each course as long as the quiz system's storage space holds out. Since a vast amount of space is reserved to hold this type of data, space scarcity should be rare. Nevertheless, when space limitations permit no further new course total accumulations for a quiz, all such data is accumulated in general chunks. Data accumulated in this manner is reported as such whenever quiz data is displayed.

-Detachment of a quiz from an instructional lesson or deletion of a quiz-producing lesson from the pool of such lessons available in the system immediately frees all the released system space for other system use. No garbage collection routines are necessary.

-All internal modifications to the system (e.g. storing gathered student data; saving information supplied by a system user to enable an instructional lesson/quiz interface) are protected both against abort (-SHIFT STOP-) attempts by students or system users and against simultaneous modifications (e.g. if more than one system user attempts to attach a quiz to an instructional lesson at the same time).

-Data made available by the administration of a quiz is retained only the first time a student attempts a quiz. This is achieved by saving the student's quiz score in his or her individual router variables enabling a check to see if a quiz score has yet been recorded. An instructor of a course thus has access to individual student quiz scores, but no additional score can be issued by the instructional lesson itself.

-When a student completes a quiz and control is transferred back to the instructional lesson, all student variables are reinstated exactly as they existed prior to the keypresses that commenced quiz administration.

-The quiz system in its entirety consists of only two programs (i.e. disregarding the individual quiz-producing lessons). "csqdata", as mentioned before, comprises the quiz system monitor that is accessed directly by both the quiz system users and the quiz system administrator. "csxquiz" is the smaller system program that handles the interface between an instructional lesson and a quiz.

APPENDIX D

The quizzes listed below either are currently available in the quiz system or are currently being developed for such availability. The authors listed are those individuals responsible at least for most of the code that produces the quizzes; in most cases, substantial aid and consultation in such areas as question development and quiz structure was provided by either/both this author or/and R. G. Montanelli, Jr.

Quiz Topic	Quiz Author
FORTRAN character manipulation	R. I. Anderson
FORTRAN 2-dimensional arrays	D. Gamage
FORTRAN DO loops	J. Miller
FORTRAN subroutines	T. Puterbaugh
FORTRAN arithmetic	J. Miller
FORTRAN functions	J. Glauert
FORTRAN formatting (elementary)	R. Bogue

The above list could possibly be expanded due to the existance of L. R. Whitlock's generative exam system. Details of the interface that enables a quiz's administration following an instructional computer science lesson were derived from details of the interface that enables the administration of an exam in the PLATO generative exam system.[5] Certain aspects of both interfaces were implemented sufficiently identical such that a problem set

[5] L. R. Whitlock, "Interactive Test Construction and Administration in the Generative Exam System", University of Illinois, Department of Computer Science, Report No. UIUCDCS-R-76-821.

available for use as a portion of an exam in the exam system could actually be made available for use as a quiz in the quiz system (and vice versa). Since all problem-set-producing lessons[6] do not incorporate question response gathering facilities as do the quiz-producing lessons, alterations to the exam system lessons would be necessary prior to such an exchange. The full potential of these exchanges is yet to be investigated.

[6] Whitlock refers to these as problem generator/graders.

BIBLIOGRAPHIC DATA SHEET	1. Report No. UIUCDCS-R-76-827	2.	3. Recipient's Accession No.
4. Title and Subtitle: USER'S MANUAL AND GUIDE TO THE ACSES QUIZ SYSTEM			5. Report Date: October 1976 6.
7. Author(s): Richard Ivan Anderson			8. Performing Organization Rept. No.
9. Performing Organization Name and Address: Department of Computer Science, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801			10. Project/Task/Work Unit No. 11. Contract/Grant No.
12. Sponsoring Organization Name and Address: Department of Computer Science, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801			13. Type of Report & Period Covered: Technical 14.

15. Supplementary Notes

16. Abstracts

This document describes the ACSES quiz system as implemented on the PLATO CAI system. The quiz system allows an instructor of a computer science course access to a pool of PLATO quizzes for use with PLATO instructional computer science lessons that will be utilized by the instructor's students. The use of a quiz with an instructional lesson provides both a study aid for each student and a means to assess how effective and thorough a computer science lesson is. This latter provision is accomplished through the collection of quiz question data which, after collected, can be analyzed in search for instructional lesson (or quiz) weaknesses.

Presented herein is a description of aspects of the quiz system from both an instructor's standpoint (e.g., instructions on how to use the system) and a student's standpoint (e.g., the interaction between the quiz and the student), some discussion of how the system is monitored and maintained, and an example of the potential behind the analyses of collected quiz question data to evaluate an instructional lesson.

Accompanying the document (in an appendix) is a self-contained paper entitled "Guidelines for Developing Computer Science Quizzes" for use by authors of quizzes to be added to the system pool.

17. Key Words and Document Analysis. 17a. Descriptors

Achievement tests
Evaluation
Education
Instructions
Computer programs

17b. Identifiers/Open-Ended Terms

17c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
RELEASE UNLIMITED	UNCLASSIFIED	43
	20. Security Class (This Page) UNCLASSIFIED	22. Price

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